

HM2142

4096-words × 1-bit Very High Speed Random Access Memory

The HM2142 is 4096-words × 1-bit very high speed read/write, random access memory developed for high speed systems such as pads and control/buffer storages.

The fabrication process uses the Hitachi's low capacitance, oxide isolation method with double metalization.

The HM2142 is encapsulated in cerdip-20 pin package.

■ FEATURES

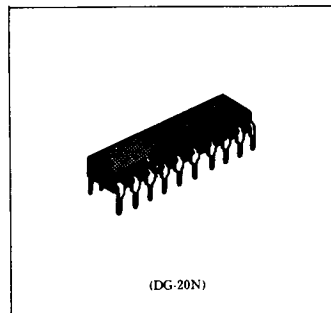
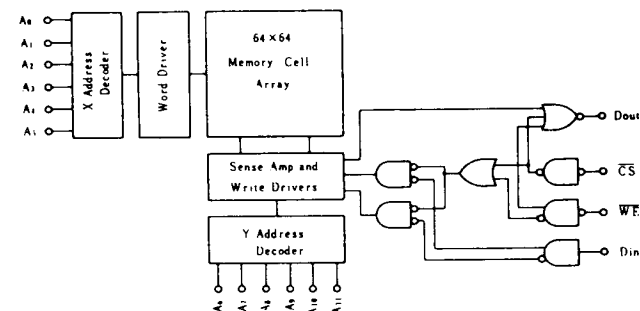
- 4096-words × 1 bit organization
- Very high speed address access time: 10ns (max)
- Write pulse width: 10ns (min)
- Power dissipation: 0.3 mW/bit
- Output obtainable by wired-OR

■ TRUTH TABLE

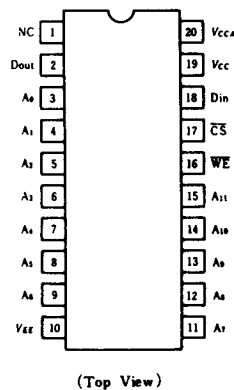
Input			Output	Mode
$\overline{CS}$	$\overline{WE}$	Din		
H	x	x	L	Not Selected
L	L	L	L	Write "0"
L	L	H	L	Write "1"
L	H	x	Dout *	Read

Notes) x : Irrelevant
* : Read Out - Noninvert

■ BLOCK DIAGRAM



■ PIN ARRANGEMENT



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■ ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Item	Symbol	Rating	Unit
Supply Voltage	V_{EE} to V_{CC}	+0.5 to -7.0	V
Input Voltage	V_{in}	+0.5 to V_{EE}	V
Output Current	I_{out}	-30	mA
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$
Storage Temperature	$T_{stg}(\text{Bias})^*$	-55 to +125	$^\circ\text{C}$

* Under Bias

■ ELECTRICAL CHARACTERISTICS

● DC CHARACTERISTICS ($V_{EE} = -5.2\text{V}$, $R_L = 50\Omega$ to -2.0V , $T_a = 0$ to $+75^\circ\text{C}$, air flow exceeding 2m/sec)

Item	Symbol	Test Condition		min(B)	typ	max(A)	Unit	
Output Voltage	V_{OH}	$V_{IN} = V_{INA}$ or V_{ILB}	0°C	−1000	—	−840	mV	
			+25°C	−980	—	−810		
			+75°C	−950	—	−720		
	V_{OL}		0°C	−1870	—	−1665		
			+25°C	−1850	—	−1650		
			+75°C	−1830	—	−1625		
Output Threshold Voltage	V_{ONC}	$V_{IN} = V_{INB}$ or V_{ILA}	0°C	−1020	—	—	mV	
			+25°C	−980	—	—		
			+75°C	−920	—	—		
	V_{OLC}		0°C	—	—	−1645		
			+25°C	—	—	−1630		
			+75°C	—	—	−1605		
Input Voltage	V_{IH}	Guaranteed Input Voltage High for All Inputs	0°C	−1165	—	−880	mV	
			+25°C	−1165	—	−880		
			+75°C	−1165	—	−880		
	V_{IL}	Guaranteed Input Voltage Low for All Inputs	0°C	−1810	—	−1560		
			+25°C	−1810	—	−1560		
			+75°C	−1810	—	−1560		
Input Current	I_{IN}	$V_{IN} = V_{INA}$	0 to +75°C	—	—	220	μA	
	I_{IL}	CS	$V_{IN} = V_{ILB}$	0 to +75°C	0.5	—		170
		Others		—	50	—		—
Supply Current	I_{EE}	All Input and Output Open.	$T_a = 0^\circ\text{C}$	−270	−240	—	mA	
			$T_a = 75^\circ\text{C}$	—	−220	—		

● AC CHARACTERISTICS ($V_{EE} = -5.2\text{V} \pm 5\%$, $T_a = 0$ to $+75^\circ\text{C}$, air flow exceeding 2m/sec)

1. READ MODE

Item	Symbol	Test Condition	min	typ	max	Unit
Chip Select Access Time	t_{ACS}		—	—	6	ns
Chip Select Recovery Time	t_{RCS}		—	—	6	ns
Address Access Time	t_{AA}		—	—	10	ns

2. WRITE MODE

Item	Symbol	Test Condition	min	typ	max	Unit
Write Pulse Width	t_w	$t_{WSA} = 3\text{ns}$	10	—	—	ns
Data Setup Time	t_{WSD}		1	—	—	ns
Data Hold Time	t_{WHD}		1	—	—	ns
Address Setup Time	t_{WSA}	$t_w = 10\text{ns}$	3	—	—	ns
Address Hold Time	t_{WHA}		2	—	—	ns
Chip Select Setup Time	t_{WSCS}		1	—	—	ns
Chip Select Hold Time	t_{WHCS}		1	—	—	ns
Write Disable Time	t_{WD}		—	—	6	ns
Write Recovery Time	t_{WR}		—	—	12	ns



3. RISE/FALL TIME

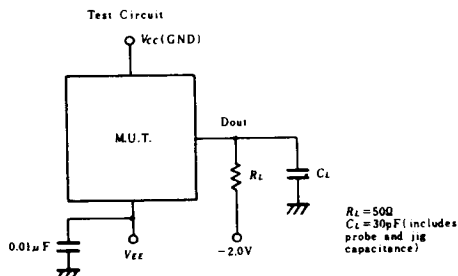
Item	Symbol	Test Condition	min	typ	max	Unit
Output Rise Time	t_r		—	2	—	ns
Output Fall Time	t_f		—	2	—	ns

4. CAPACITANCE

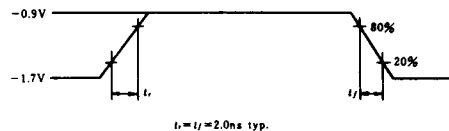
Item	Symbol	Test Condition	min	typ	max	Unit
Input Capacitance	C_{in}		—	3	—	pF
Output Capacitance	C_{out}		—	5	—	pF

■ TEST CIRCUIT AND WAVEFORMS

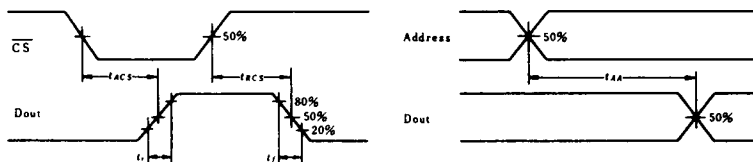
1. LOADING CONDITION



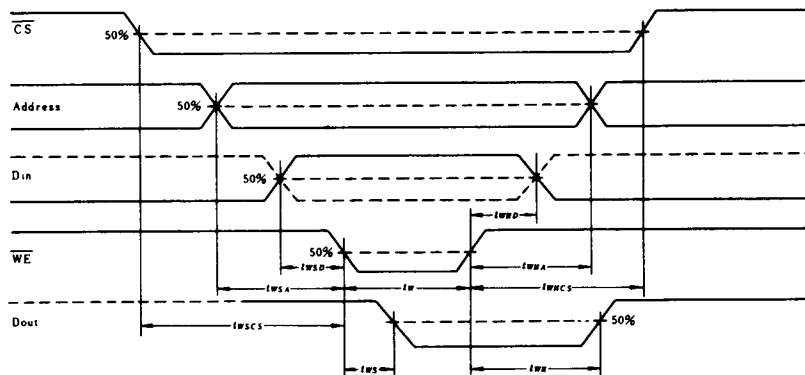
2. INPUT PULSE



3. READ MODE



4. WRITE MODE



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